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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366
December 20, 1994

MEMORANDUM

SUBJECT: Spokane Junkyard Dissolved Metals in Water
Sample Nos: 94464301 - 94464302

FROM: Isabel Chamberlain, Task Monitor, USEPA, Region 10 

TO: Kevin Rochlin, Site Manager, USEPA, Region 10

FULL DATA REVIEW

I have reviewed the attached data package and the corresponding raw data. Based on this review, I find that the Self Evaluation Report prepared by the ESAT contractor was conducted in accordance with the Functional Guidelines, and that the data qualifiers recommended in the ESAT contractor's evaluation are appropriate.

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ENVIRONMENTAL SERVICE ASSISTANCE TEAMS - ZONE 2

ICF Technology Inc.
ManTech Environmental

ESAT Region 10
ICF Technology Inc.
7411 Beach Drive East
Port Orchard, WA 98366
Phone (206) 871-8760

MEMORANDUM

DATE: December 16, 1994

TO: Jerry Muth, Regional Project Officer, USEPA, Region 10
Isa Chamberlain, Task Monitor, USEPA, Region 10
Kevin Rochlin, Project Officer, USEPA, Region 10

THROUGH: Barry Pepich, Team Manager, ESAT, Region 10 *Barry V. Pepich*

FROM: John Alexander, Senior Chemist, ESAT, Region 10 *John Alexander 12/16/94*

SUBJECT: Quality Assurance Review of Spokane Junkyard Dissolved Metals in Water Analysis
Sample Nos: 94464301, 94464302
Project Code: TEC-637A; Account Code: 955T10PTFA10A5U

TID#: 10-9410-509
DOC#: ESAT-10A-7669
WUD#: 1517

cc: Charles Stringer, USEPA-OCI, SO-155

The following is a quality assurance review of the dissolved metals analysis of two water samples from the Spokane Junkyard site, Spokane, WA. The analysis was performed following CLP and laboratory guidelines by the ESAT Team at the USEPA Manchester Environmental Laboratory, Port Orchard, WA. This quality assurance review was conducted for the following samples:

94464301 94464302

DATA QUALIFICATIONS

The following comments refer to the ESAT Team's performance in meeting quality control specifications outlined in the *CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILMO3.0*, the *Manchester Environmental Laboratory Quality Assurance Manual, revision 5/88* and the *Draft Quality Assurance Project Plan, Spokane Junkyard Site, August, 1994*. The recommendations presented herein are based on the information provided for the review.

1.0 TIMELINESS - Acceptable

The suggested holding time from the date of collection for mercury in water is 28 days and the holding time for remaining metals in water is 180 days. The samples were collected on 11/17/94. Mercury analysis was completed by 11/23/94, six days from collection. The remaining metals analyses were completed by 12/13/94, twenty-six days from collection of the first sample. No qualification was recommended based on these holding time criteria.

2.0 SAMPLE PREPARATION - Acceptable

The turbidity of all samples was less than 1 NTU; therefore, no digestion was required for ICP-AES, GFAAS and ICP-MS analyses. These samples were transferred to analytical containers on 12/01/94 and quality assurance samples were prepared at that time. Mercury preparation was performed on 11/22/94. All procedures were in accordance with Manchester Laboratory and CLP protocols. Qualification was not recommended on this basis.

3.0 CALIBRATION - Acceptable

The samples were analyzed by ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) on 12/02/94. The instrument was standardized according to the analytical method using a blank and a series of calibration standards.

The samples were analyzed by ICP-MS (Inductively Coupled Plasma - Mass Spectrometry) on 12/13/94 for lead, selenium, and thallium. The instrument was calibrated according to the analytical method with a matrix blank and at least two standards. Correlation coefficients were greater than the minimum required 0.995.

The samples were analyzed by CVAAS (Cold Vapor Atomic Absorption Spectroscopy) on 11/23/94 for mercury. Initial calibration included a blank and at least four standards, as required. The curve was linear with a correlation coefficient greater than 0.995.

The samples were analyzed by GFAAS (Graphite Furnace Atomic Absorption Spectroscopy) on 12/14/94 for arsenic. The instrument was calibrated according to the analytical method with a matrix blank and at least three standards. The curve was linear with a correlation coefficient greater than 0.995.

All calibrations met acceptable criteria therefore no qualification was recommended on this basis.

4.0 REFERENCE CONTROL SAMPLES/CALIBRATION VERIFICATION - Acceptable

Laboratory reference control samples are required before and after sample analysis and after every 10 samples during analysis. All control samples met frequency and recovery criteria of 90 - 110% for ICP-AES, GFAAS and ICP-MS, and 80 - 120% for CVAAS (mercury) analysis. Qualification was not recommended on this basis.

5.0 BLANKS - Acceptable

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analysis procedure. If an analyte was found in the associated blank, the sample results were recommended for qualification if the analyte concentration was less than ten times the analytical value in the blank.

No analytes were detected in the procedural blanks. No qualification was recommended on this basis.

6.0 ICP-AES INTERFERENCE CHECK SAMPLE - Acceptable

The interference check sample (ICS) is analyzed by ICP-AES to verify interelement and background correction factors. Analysis is required at the beginning and end of each sample analysis run. The acceptance criterion for the ICS is 80% - 120%. All results met frequency and recovery requirements on the day of analysis.

7.0 DUPLICATE ANALYSIS - Acceptable

Duplicate analysis was performed on sample 94464301. All results above the laboratory's practical quantitation limit were within the acceptable precision limit as demonstrated by RPD values less than 20%. No qualification was recommended on this basis.

8.0 FIELD DUPLICATE ANALYSIS - Not Applicable

Field duplicate analysis was not indicated in the field collection documentation.

9.0 MATRIX SPIKE ANALYSIS - Acceptable

Matrix spike sample analyses are performed to provide information about the effect of the sample matrix on digestion and measurement methods. Manchester Laboratory and CLP guidelines specify that the matrix spike recovery must be within the limits of 75 - 125%. Analytical post spike recoveries must be within 85 - 115%. Because these samples did not require digestion, the laboratory applies the stricter 85 - 115% criterion to the spike recoveries. Matrix spike/matrix spike duplicate analysis was performed on sample 94464301. All recoveries were within acceptable limits, except selenium (116%/126%). However, selenium was not detected in the samples; therefore, no bias was demonstrated. On this basis, no qualification was recommended.

10.0 GRAPHITE FURNACE ATOMIC ABSORPTION SPEC. (GFAAS) QC - Acceptable

GFAAS requires duplicate injections and analytical post spike analysis for each sample. Duplicate injections must be within 10% RPD if the analyte concentration is greater than the practical quantitation limit. Post spike recovery must be within 85 - 115%. All duplicate injections and post spike recoveries were within the specified criteria. No qualification was recommended on this basis.

11.0 ICP-AES SERIAL DILUTION - Acceptable

Sample 94464301 was analyzed by serial dilution. All results greater than fifty times the IDL were within the required 10% criterion range. No qualification was recommended on this basis.

12.0 DETECTION LIMITS - Acceptable

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the (U) qualifier is recommended for attachment. Any sample result falling between the detection limit and the quantitation limit is recommended for qualification as an estimate (P). This notifies the data user that the element was detected at the reported value, but below the minimum level of practical quantitation determined to be within precision limits of 10% relative standard deviation.

13.0 OVERALL ASSESSMENT OF THE DATA

The quality assurance review of the data is based on the criteria outlined in the *Laboratory USEPA CLP Functional Guidelines for Inorganic Data Reviews (2/94)*.

The following is a summary of the recommended qualification for the Spokane Junkyard Water Samples - Dissolved Metals Analysis, samples numbered 94464301 and 94464302.

The (U) qualifier was recommended for attachment to sample results below the minimum level of detection. The (P) qualifier was recommended for attachment to sample results less than the laboratory's quantitation limit.

No additional qualification (0%) was recommended.

Definitions of laboratory data qualifiers are attached.

USEPA Region 10 Laboratory

Below are the definitions for the qualifiers used in the metals area when qualifying data from metals analysis.

DATA QUALIFIERS

- U - Element was analyzed but not detected. The associated numerical value is the instrument detection limit/method detection limit.
- P - The analyte was detected above the Instrument Detection Limit, but not quantified within expected limits of precision. The laboratory has established minimum quantitation limits having a relative standard deviation of no more than 10%.
- H - The samples were analyzed after the suggested holding time limit.
- E - The reported value is an estimate because of the presence of interference. An explanatory note will be included with the report.
- B - Analyte is found in the analytical blank as well as the sample indicating possible/probable blank contamination. If analytes are found in any of the associated procedural blanks the concentration in the samples must be at least ten times the quantity observed in the blank. If the sample result fails these criteria the sample result is qualified (B).
- N - Spiked sample recovery not within control limits.
- NAR - There is no analysis result for this analyte.
- NA - Not Applicable/Not Required.
- S - Sample was analyzed by method of standard additions.
- +
- Sample was analyzed by method of standard additions and the correlation coefficient was less than 0.995.
- *
- The analyte was present in the sample.
- W - Post spike out of specified range, and sample was less than 50% the spike added.

12/23/94

Manchester Environmental Laboratory

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 10/25/94
Matrix: Liquid-Total
Sample Number: 94414391
Type: Reg sample
Station Description: MW-2

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
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MET

All MERCURY tests

Mercury	0.20	ug/L	U
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Metals, ICP RAS

Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	2.0	ug/L	U
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	72.8	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	11	ug/L	P
Magnesium	20	ug/L	U
Manganese	1.0	ug/L	U
Nickel	10	ug/L	U
Potassium	350	ug/L	U
Silver	3.0	ug/L	U
Sodium	139	ug/L	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Metals, ICP/MS

Arsenic	1.0	ug/L	U
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Lead	0.50	ug/L	U
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94414391 Reg sample

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Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr
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Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94414391
Type: Duplicate
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET**All MERCURY tests**

Mercury	0.20	ug/L	U
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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94414391
Type: Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr
MET			
All MERCURY tests			
Mercury	98	%Rec	

Analyte	Result	Units	Qlfr
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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94414391
Type: Matrix Spike Dupl
Station Description:

Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests

Mercury	99	%Rec	
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Analyte	Result	Units	Qlfr
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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 11/17/94
Matrix: Liquid-Diss.
Sample Number: 94464301
Type: Reg sample
Station Description: MW-1

Analyte	Result	Units	Qlfr
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MET

Arsenic by AA, RAS
Arsenic

3.1	ug/L	P
-----	------	---

All MERCURY tests
Mercury

0.20	ug/L	U
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Metals, ICP RAS

Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	25.7	ug/L	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	36600	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	15100	ug/L	
Manganese	1.8	ug/L	P
Nickel	10	ug/L	U
Potassium	1600	ug/L	P
Silver	3.0	ug/L	U
Sodium	3290	ug/L	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
Metals, ICP/MS							
Lead	0.50	ug/L	U				
Selenium	2.0	ug/L	U				
Thallium	1.0	ug/L	U				

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Diss.
Sample Number: 94464301
Type: Duplicate
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
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MET**Arsenic by AA, RAS**

Arsenic	3.0	ug/L	P
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All MERCURY tests

Mercury	0.20	ug/L	U
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Metals, ICP RAS

Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	26.1	ug/L	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	36100	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	15200	ug/L	
Manganese	2.1	ug/L	P
Nickel	10	ug/L	U
Potassium	1400	ug/L	P
Silver	3.0	ug/L	U
Sodium	3350	ug/L	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

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Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
Metals, ICP/MS							
Lead	0.50	ug/L	U				
Selenium	2.0	ug/L	U				
Thallium	1.0	ug/L	U				

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Diss.
Sample Number: 94464301
Type: Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr
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MET**Arsenic by AA, RAS**

Arsenic	90	%Rec	
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All MERCURY tests

Mercury	107	%Rec	
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Metals, ICP RAS

Aluminum	108	%Rec	
Antimony	107	%Rec	
Barium	106	%Rec	
Beryllium	107	%Rec	
Cadmium	109	%Rec	
Calcium	NA	%Rec	
Chromium	100	%Rec	
Cobalt	103	%Rec	
Copper	107	%Rec	
Iron	104	%Rec	
Magnesium	NA	%Rec	
Manganese	102	%Rec	
Nickel	103	%Rec	
Potassium	NA	%Rec	
Silver	102	%Rec	
Sodium	NA	%Rec	
Vanadium	107	%Rec	
Zinc	108	%Rec	

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
Metals, ICP/MS							
Lead	99	%Rec					
Selenium	116	%Rec					
Thallium	104	%Rec					

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Diss.
Sample Number: 94464301
Type: Matrix Spike Dupl
Station Description:

Analyte	Result	Units	Qlfr
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MET**Arsenic by AA, RAS**

Arsenic	90	%Rec	
---------	----	------	--

All MERCURY tests

Mercury	107	%Rec	
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Metals, ICP RAS

Aluminum	106	%Rec	
Antimony	106	%Rec	
Barium	104	%Rec	
Beryllium	104	%Rec	
Cadmium	111	%Rec	
Calcium	NA	%Rec	
Chromium	99	%Rec	
Cobalt	100	%Rec	
Copper	105	%Rec	
Iron	103	%Rec	
Magnesium	NA	%Rec	
Manganese	102	%Rec	
Nickel	100	%Rec	
Potassium	NA	%Rec	
Silver	103	%Rec	
Sodium	NA	%Rec	
Vanadium	106	%Rec	
Zinc	102	%Rec	

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
Metals, ICP/MS							
Lead	102	%Rec					
Selenium	126	%Rec					
Thallium	106	%Rec					

Manchester Environmental Laboratory
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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 11/17/94
Matrix: Liquid-Diss.
Sample Number: 94464302
Type: Reg sample
Station Description: MW-2

Analyte	Result	Units	Qlfr
MET			
Arsenic by AA, RAS			
Arsenic	3.4	ug/L	P
All MERCURY tests			
Mercury	0.20	ug/L	U
Metals, ICP RAS			
Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	23.9	ug/L	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	36700	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	13800	ug/L	
Manganese	4.8	ug/L	P
Nickel	10	ug/L	U
Potassium	2000	ug/L	P
Silver	3.0	ug/L	U
Sodium	3350	ug/L	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
Metals, ICP/MS							
Lead	0.50	ug/L	U				
Selenium	2.0	ug/L	U				
Thallium	1.0	ug/L	U				

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 11/17/94
Matrix: Liquid-Total
Sample Number: 94464307
Type: Reg sample
Station Description: MW-1

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
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MET**All MERCURY tests**

Mercury	0.20	ug/L	U
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Metals, ICP RAS

Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	24.4	ug/L	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	36300	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	14400	ug/L	
Manganese	2.1	ug/L	P
Nickel	10	ug/L	U
Potassium	1700	ug/L	P
Silver	3.0	ug/L	U
Sodium	3100	ug/L	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Metals, ICP/MS

Arsenic	3.4	ug/L	P
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Lead	1.02	ug/L	
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Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U				
Thallium	1.0	ug/L	U				

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94464307
Type: Duplicate
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests

Mercury	0.20	ug/L	U
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94464307 Duplicate

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94464307
Type: Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests
Mercury

106	%Rec
-----	------

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94464307
Type: Matrix Spike Dupl
Station Description:

Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests
Mercury

107	%Rec
-----	------

Analyte	Result	Units	Qlfr
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Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected: 11/17/94
Matrix: Liquid-Total
Sample Number: 94464308
Type: Reg sample
Station Description: MW-2

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
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MET**All MERCURY tests**

Mercury	0.20	ug/L	U
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Metals, ICP RAS

Aluminum	44	ug/L	P
Antimony	40	ug/L	U
Barium	22.9	ug/L	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	32200	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	6.8	ug/L	P
Iron	78.8	ug/L	
Magnesium	12500	ug/L	
Manganese	6.82	ug/L	
Nickel	10	ug/L	U
Potassium	1400	ug/L	P
Silver	3.0	ug/L	U
Sodium	3160	ug/L	
Vanadium	3.0	ug/L	U
Zinc	7.2	ug/L	P

Metals, ICP/MS

Arsenic	3.6	ug/L	P
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Lead	1.09	ug/L	
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Analyte	Result	Units	Qlfr
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr
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Manchester Environmental Laboratory
Final Report

Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94464308
Type: Duplicate
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
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MET**Metals, ICP RAS**

Aluminum	29	ug/L	P
Antimony	40	ug/L	U
Barium	22.7	ug/L	
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	32900	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	7.7	ug/L	P
Iron	65.2	ug/L	
Magnesium	12500	ug/L	
Manganese	6.53	ug/L	
Nickel	10	ug/L	U
Potassium	1600	ug/L	P
Silver	3.0	ug/L	U
Sodium	3200	ug/L	
Vanadium	3.0	ug/L	U
Zinc	6.1	ug/L	P

Metals, ICP/MS

Arsenic	3.6	ug/L	P
Lead	0.72	ug/L	P
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

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Analyte

Result

Units

Qlfr

Analyte

Result

Units

Qlfr

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94464308
Type: Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr
---------	--------	-------	------

Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET**Metals, ICP RAS**

Aluminum	100	%Rec
Antimony	96	%Rec
Barium	98	%Rec
Beryllium	97	%Rec
Cadmium	103	%Rec
Calcium	NA	%Rec
Chromium	96	%Rec
Cobalt	95	%Rec
Copper	100	%Rec
Iron	104	%Rec
Magnesium	NA	%Rec
Manganese	97	%Rec
Nickel	95	%Rec
Potassium	NA	%Rec
Silver	94	%Rec
Sodium	NA	%Rec
Vanadium	99	%Rec
Zinc	96	%Rec

Metals, ICP/MS

Arsenic	106	%Rec
Lead	97	%Rec
Selenium	110	%Rec
Thallium	100	%Rec

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Analyte

Result

Units

Qlfr

Analyte

Result

Units

Qlfr

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: 94464308
Type: Matrix Spike Dupl
Station Description:

Analyte	Result	Units	Qlfr
---------	--------	-------	------

Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET**Metals, ICP RAS**

Aluminum	99	%Rec
Antimony	98	%Rec
Barium	99	%Rec
Beryllium	100	%Rec
Cadmium	102	%Rec
Calcium	NA	%Rec
Chromium	100	%Rec
Cobalt	98	%Rec
Copper	99	%Rec
Iron	98	%Rec
Magnesium	NA	%Rec
Manganese	98	%Rec
Nickel	98	%Rec
Potassium	NA	%Rec
Silver	98	%Rec
Sodium	NA	%Rec
Vanadium	101	%Rec
Zinc	97	%Rec

Metals, ICP/MS

Arsenic	107	%Rec
Lead	95	%Rec
Selenium	112	%Rec
Thallium	102	%Rec

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Analyte

Result

Units

Qlfr

Analyte

Result

Units

Qlfr

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941115A
Type: Blank
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests

Mercury	0.20	ug/L	U
---------	------	------	---

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941122B
Type: Blank
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests
Mercury

0.20	ug/L	U
------	------	---

W941122B Blank

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941122C
Type: Blank
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

All MERCURY tests
Mercury

0.20	ug/L	U
------	------	---

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941129A
Type: Blank
Station Description:

Analyte	Result	Units	Qlfr
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Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET**Metals, ICP RAS**

Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	2.0	ug/L	U
Beryllium	0.52	ug/L	P
Cadmium	2.0	ug/L	U
Calcium	11.2	ug/L	
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	20	ug/L	U
Manganese	1.0	ug/L	U
Nickel	10	ug/L	U
Potassium	350	ug/L	U
Silver	3.0	ug/L	U
Sodium	161	ug/L	
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Metals, ICP/MS

Arsenic	1.0	ug/L	U
Lead	0.50	ug/L	U
Selenium	2.0	ug/L	U
Thallium	1.0	ug/L	U

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Analyte

Result

Units

Qlfr

Analyte

Result

Units

Qlfr

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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941201A
Type: Blank
Station Description:

Analyte	Result	Units	Qlfr
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MET**Arsenic by AA, RAS**

Arsenic	1.5	ug/L	U
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Metals, ICP RAS

Aluminum	20	ug/L	U
Antimony	40	ug/L	U
Barium	2.0	ug/L	U
Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U
Calcium	5.0	ug/L	U
Chromium	5.0	ug/L	U
Cobalt	10	ug/L	U
Copper	3.0	ug/L	U
Iron	10	ug/L	U
Magnesium	20	ug/L	U
Manganese	1.0	ug/L	U
Nickel	10	ug/L	U
Potassium	350	ug/L	U
Silver	3.0	ug/L	U
Sodium	20	ug/L	U
Vanadium	3.0	ug/L	U
Zinc	4.0	ug/L	U

Analyte	Result	Units	Qlfr
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Metals, ICP/MS

Lead	0.50	ug/L	U
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Selenium	2.0	ug/L	U
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Analyte	Result	Units	Qlfr
Thallium	1.0	ug/L	U

Analyte	Result	Units	Qlfr
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Project Code: TEC-637A
Project Name: SPOKANE JUNKYARD
Project Officer: KEVIN ROCHLIN
Account Code: 955T10PTFA10A5U

Collected:
Matrix: Liquid-Total
Sample Number: W941201A
Type: Spike Blank
Station Description:

Analyte	Result	Units	Qlfr
---------	--------	-------	------

MET

Arsenic by AA, RAS
Arsenic

94 %Rec

Analyte	Result	Units	Qlfr
---------	--------	-------	------

W941201A Spike Blank